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ABSTRACT

Paper presented at the Regional achievement in a nursing course in an integrated curriculum were studied. The theoretical framework was based on Kolb's model of experiential learning, which posited four phases: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Kolb's Learning Style Inventory was used to assess preferences for these four learning modes. Student achievement in the following areas were measured: knowledge, recall, and comprehension of cognitive material (quizzes); and ability to analyze clinical situations and apply principles of the nursing process (clinical process papers). A quasi-experimental, within-subjects factorial design was employed with a descriptive survey technique. The sample consisted of 133 basic baccalaureate nursing students enrolled in a junior-year course. Differences in learning style preferences were demonstrated. Overall, nursing students scored lower on the reflective observation (RO) subscale. A low RO score may indicate less preference for association learning, concept learning, and problem solving. (SW)

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RELATIONSHIPS BETWEEN PREFERRED LEARNING AND CLINICAL ACHIEVEMENT OF BACCALAUREATE NURSING STUDENTS

by

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Since the late 1960's baccalaureate nursing curricula have been organizing according to integrated models of nursing practice. Integrated nursing curricula have two major goals: to provide educational experiences which emphasize conceptual constructs unique to nursing, and to emphasize the nursing process that can be implemented in many different settings (Torres, 1974). Integrated nursing courses developed within these curricula require students to learn facts, relate these facts to each other, derive conceptual constructs, apply conceptual constructs to clinical examples, and problem solve in direct clinical care experiences.

In addition, the current registered nurse licensure examination is integrated around the nursing process. Although divided into four two hour parts, there is one score for the total examination. The National Council of State Boards of Nursing adopted an integrated blueprint for use in developing the licensure examination. The blueprint illustrates nursing's interaction with clients in the context of three basic elements; growth and development, lifestyle, and unanticipated events. Such organization of nursing content requires the student to conceptualize nursing knowledge on several different levels. Students must not only learn discrete facts, they must also be able to focus upon general principles in order to formulate deductions in the clinical setting. The needs of students in integrated programs, preparing for an integrated examination may be unique in many ways which are not currently described in the research literature.

While many variables interrelate to influence outcomes in both course achievement and achievement on licensing examinations, there is some theoretical evidence that a student's preferred learning style may have an impact on cognitive achievement. Kirby (1979) suggests that cognitive style and learning

style have implications for skill transfer in vocational educational programs. Learning style assessment also provides a framework within which instructional preferences can be examined. Examining differences in learner behavior as a result of the individual interacting with a given environment which occurs in teaching-learning situations provides a framework for describing the way students prefer to learn as well as how this preference impacts upon their achievement.

The purpose of this research is to describe relationships between preferred learning style and cognitive achievement in one nursing course in an integrated curriculum. The specific objectives of this study are to determine if (1) differences in learning style preferences can be demonstated and (2) if they are related to achievement on any of the outcome measures which were defined for this course.

Theoretical Framework

Kolb's model of experiential learning (1976) is used as the framework for hypothesizing differences in achievement as a function of learning style preference in undergraduate students who participated in this study. According to Kolb's model there are four phases in the experiential learning cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Individual learners have distinct preferences for using specific phases of the learning model.

The first phase is concrete experiencing (CE) of a learning situation. The senses are primarily involved as all stimuli from the learning situation are taken in as input. Sensory modes are utilized to gather data regarding the event. Learning takes place by immediate, direct, involvement on the part of the learner in the actual learning event. Learners who prefer concrete experience are openly involved in learning situations in a direct, unbiased

manner.

The second phase is reflective observation (RO) upon relevant phenomena derived from the situation. The learner mentally associates the data that have been gathered by the senses. As associations are made, the learner is in effect thinking about the relationships among the various observations which have been made. This phase of learning can occur in the actual situation or apart from it. It is possible to reflect upon perceptual events from many points of view. Outcomes of reflective observation depend upon the mental facility of the individual learner as well as the number of previous experiences which the learner is able to associate with the current learning event. Learners who prefer reflective observation choose observing and reflecting upon experiences from a variety of perspectives, in a divergent manner.

The third phase is abstract conceptualization (AC) about the meaning of what has been observed. The learner derives hypotheses regarding the nature of observations which have been made. Explanations are generated for relationships among the various observations which have been identified. Learners who prefer abstract conceptualization create concepts that combine observations to provide logical plausible explanations about relevant phenomena which they have observed.

Finally, in the fourth phase of active experimentation (AE) the learner tests out hypotheses which have been generated as explanations for the relationships among observed phenomena. Learners who prefer this mode use existing explanations and theories to solve problems in reality based learning situations. These learners prefer to be actively involved with the learning situation again. Thus, the model describes the cycle as beginning and ending with a specific concrete situation.

The experiential learning cycle suggests two primary dimensions of the

learning process. Concrete experience is the polar opposite of abstract conceptualization; reflective observation is the opposite of active experimentation or hypothesis testing. Ideally, the learner should be affectively oriented toward using all four modes of the experiential learning cycle. However, the methods an individual consistently chooses to accomplish particular learning tasks indicate that distinct preferences exist for using specific modes.

Instruments

Kolb suggests that the degree to which a person favors particular stages of the cycle indicates the learning style preferences of that person. He developed the Learning Style Inventory (LSI) to assess preferences for these four modes of learning. The four subscales CE, RO, AC, and AE constitute the instrument.

Kolb's LSI (1978) uses a forced-choice ranking technique to determine a respondent's preference for a particular learning style subscale. It is a self-administered questionnaire that incorporates the scale and distractor words into nine items or sets of words. Scores for the four learning style subscales are obtained by summing the ranks assigned each of the six words that comprise the particular scales. Ranks assigned distractor words are ignored.

Correlations between words that comprised the four learning style subscales and total scale scores ranged between .46 and .67 (Kolb, 1978). Additionally, words comprising a scale correlated negatively with the theoretically opposite scale. Kolb concluded that the four subscale scores demonstrated convergent and discriminant validity. Odd-even split-half reliability coefficients (Kolb, 1978) for the four individual subscale scores were reported as ranging from .37 to .81 for five groups of respondents from which data were obtained (N=687). Test-retest reliability correlations for four groups of respondents ranged between .33 to .73 (N=110).

Evaluation tools for course objectives were developed in order to obtain measures of student achievement in the following areas: 1) knowledge, recall, and comprehension of cognitive material (quizzes); 2) ability to analyze clinical situations and apply principles of the nursing process (clinical process papers). These areas are defined according to Bloom's taxonomy as measuring different levels of objectives. Quizzes are at the level of knowledge, recall, and comprehension; clinical process papers are at the analysis and application level. Leveling of objectives according to these areas is consistent with learning theory as defined in Gagne's (1977) model.

The two quizzes developed for this course were each composed of 100 items evaluating knowledge, recall, and comprehension of facts, associations, principles, and general definitions of terms. Alpha reliability coefficients for quizzes ranged between .70 and .83 when previously administered to four different groups of baccalaureate nursing students (N=319).

Clinical process papers were constructed to test for analysis, and application of knowledge in simulated clinical situations using the four components of the nursing process (assessment, planning, intervention, and evaluation). Situations were constructed to simulate state board examination questions as far as possible. Alpha reliability coeffients for these instruments ranged between .65 and .78 when previously administered to the same four different groups of baccalaureate students (N=319).

Method

A quasi experimental within-subjects factorial design was employed with a descriptive survey technique. The relationships between learning style preference and achievement on outcome measures (quizzes (2), and clinical process papers (2)) were determined.

The sample consisted of 145 basic baccalaureate nursing students enrolled

over two semesters in a theory/practicum course of the junior year in an integrated curriculum. A total of 133 (91.72%) agreed to participate by completing the LSI on the first day of the course. Scoring procedures used were those described by Kolb (1978).

Clinical process paper scores (CPP1 and CPP2) were collected as scheduled throughout the two semesters in which the course was taught. Quizzes were administered prior to the first clinical process paper at midterm and prior to the second clinical process paper at the end of the semester. Data were processed using the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

Results

Table 1 shows correlation coefficients for the subscales of the LSI instrument.

Table 1. Correlation Coefficients for LSI Subscales

LSI Subscales	CE	RO	AC	AE
CE	1.00	-.01	-.59	-.04
RO	-.02	1.00	-.25	-.51
AC	-.59	-.25	1.00	-.18
AE	.05	-.51	-.18	1.00

Results of reliability procedures indicate that the subscales measure the two primary dimensions of the learning cycle as described by Kolb. Abstract conceptualization (AC) correlates negatively with concrete experience (CE); reflective observation (RO) correlates negatively with active experimentation (AE). These findings are consistent with those reported by Kolb (1978).

Table 2. Mean Scores@ and Ranges for LSI Subscales

LSI Subscale	Scale Mean	Range
CE	16.74	9-24
RO	*13.68	6-22
AC	15.74	8-24
AE	15.54	7-21

@The higher the mean score the greater the preference for a learning style score *p<.05

Table 5. Reliability coefficients for LSI subscales and Outcome Measures

Outcome Measures	LSI SUBSCALES CE	RO	AC	AE
Q1	.06	-.32	.26	.07
Q2	-.42	-.56	.49	-.01
CPP1	-.06	-.36	.64	.09
CPP2	-.01	-.58	.38	.06

Results of reliability procedures indicate a negative correlation on all outcome measures for subscale RO; a positive correlation is indicated on all outcome measures for subscale AC.

Discussion

The findings of this study do indicate that differences in learning style preferences can be demonstrated. The LSI instrument seems to measure two primary dimensions in the learning cycle. In this pilot study there were significant differences on the subscale RO. These nursing students scored lower, overall, on the RO subscale. If this scale measures discrimination learning, as Kolb suggests, a low score on the RO dimension indicates less preference for discrimination learning than for association learning, concept learning, and problem solving. Discrimination learning is of great importance in nursing education and practice. Nurses are constantly faced with distinguishing one class of conditions from another by learning and using a system of signs and symptoms. Nursing intervention is also based on the assessment of patients (CE) which involves the process of discriminating normal or expected conditions from abnormal ones (RO) in the formulation of a nursing diagnosis (AE).

Negative correlations for subscale RO on all outcome measures suggest that students need help discriminating among similar cognitive associations. Discrimination learning is difficult when materials are similar; the instructors task is to reduce similarity between associations. This can be accomplished by

Results of ANOVA procedures indicated that the mean preference score for the reflective observation subscale was significantly different from the preferences expressed by these students on the other three subscales.

Table 3 shows mean scores and ranges for outcome measures in the course.

Table 3. Mean Scores and Ranges for Outcome Measures

Outcome Measure	Mean Scores	Ranges
Quiz 1 (Q1)	88.55	66-99
Quiz 2 (Q2)	85.88	58-99
Clinical PP (CPP1)	82.41	65-94
Clinical PP (CPP2)	75.93	60-92

Table 4 shows results of ANOVA procedures for outcome measures and subscales of the LSI. Subscales were treated as independent variables and outcome measures as dependent variables.

Table 4. Pairwise Comparisons for Mean Outcome Scores and LSI Subscale Scores

LSI Subscale	Outcome Measures Ordered by Size of Means			
	Q1	Q2	CPP1	CPP2
Mean	88.55	85.88	82.41	75.93
CE	*2.69	*2.76	.87	.86
RO	.63	.26	*2.72	.64
AC	*3.58	2.49	2.43	1.26
AE	.76	.74	.61	*2.70

*p<.05 F ratio > 2.68

Results of ANOVA procedures indicate that mean preference scores for subscale CE differ significantly on Quiz measures; mean preference scores for subscale RO differ significantly on the first clinical process paper measure; mean preference scores for subscale AC differ significantly on Quiz 1, AC mean preference scores approach significance on all other mesures (p>.10-.20); mean preference scores differ significantly for subscale AE on the second clinical process paper measure.

Table 5 shows reliability coefficients for subscales and outcome measures.

focusing on differences, reducing interference by making stimuli more distinctive and by providing "coding links" (EX. same for sensory-afferent; motor-efferent) using repetition to overcome forgetting, and providing positive reinforcement for correct response.

Positive correlations for subscale AC on all outcome measures suggest that students who are able to hypothesize the interrelationships among variables in an explanatory manner do better, overall, on these measures of achievement. Anderson (1966) states that "for cognitive theorists, information is the key to concept formation: information is available from stimuli in varying amounts (CE), information is (discriminated) and assimilated (RO), and information is processed with strategies that are more or less parsimonious and efficient (AC)."

Concepts are inferred mental processes and the learning of a concept requires discrimination of stimulus objects (RO) in order to distinguish "positive" and "negative" instances of the concept (AC). This is an inductive (part to whole) process in which the learner is able to place an object into a class. The learning of conjunctive, disjunctive, and relational concepts greatly enhances the students ability to analyze and apply information in the clinical setting.

Prerequisite to concept learning (AC) the learner must possess the capabilities of acquiring information (CE) and making multiple discriminations (RO). This research suggests that students who prefer abstract conceptualization as a mode of learning do well on all measures of achievement. The RO dimension is not enough. If students stop short of the abstraction of concepts from their learning experiences they tend to not do as well. High scores on the RO dimension indicate a preference for a mode which is not as well suited to the needs of students in an integrated curriculum which emphasizes conceptual learning.

Based upon the patterns of preferences expressed by the learners who

participated in this research, the following propositions are stated.

1. Students who score lower on the RO subscale than on the other subscales are significantly different from students who score higher.

2. High scores on the RO subscale indicate a preference for stopping the learning cycle at a stage prerequisite to concept learning. These students may require instructor guidance in developing abstract conceptualization learning skills.

3. High scores on the AC subscale indicates a preference for a mode in the learning cycle which is related to greater overall achievement on the measures in an integrated nursing curriculum.

These findings suggest that faculty need to give consideration to learning style assessment in order to identify learners who may have difficulty achieving the transformations in the learning process required to analyze and apply nursing concepts in the clinical setting. Instructional methods and individualized learning experiences which facilitate student achievement in integrated nursing curricula can then be developed. In addition, it may be possible to develop predictive models of success and/or failure in both integrated nursing curricula and on the licensing examination.

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